

# THE CANNON

January 15, 1980

University of Toronto Engineering Society

Volume II, No. 5

## Engineers in conference.

On January 2, 1980, four delegates from the University of Toronto's Engineering Society departed for the 12th Annual Congress of Canadian Engineering Students (CCES) conference held in Edmonton Alberta. The CCES is an organization which was formed to facilitate better communication among engineering students in Canada, and to serve in their mutual interests. The purpose of the Congress can basically be summed up as:

- i) Encourage information exchanges
- ii) Discuss relevant issues.

These purposes are primarily met during the CCES' annual conference which this year was attended by about 160 delegates from 35 Engineering schools across Canada.

The theme of the 12th Congress was "The Engineer and the Corporate System." Throughout the conference the delegates attended seminars and workshops pertaining to this topic. Areas considered included the career development of an engineer after university; the different areas such as consulting, management, technical-research, and government that are open to the engineer; and the development of Canadian technology and the direction of engineering in Canada today.

The following is a synopsis of the conference;

Thursday, January 3, was "Careers Day" at this conference, and the morning program was composed of two professional speakers who spoke on certain aspects of the preparation for an engineering career.

The first speaker was Ms. Lorna Johnson, who at present is in charge of recruiting for Shell Canada Resources Ltd. Lorna discussed various points to remember when preparing for an interview with a specific company, specifically 1) a reasonable research of the company's past history and its training programs and, 2) a fairly good idea of what goals you would like the company interviewer to hear about. She discussed minor points about the actual interview, i.e., being dressed neatly, looking the interviewer directly in the eye when speaking, and making sure you have a few questions to ask of the interviewer at the end of the interview period. Ms. Johnson concluded by wishing every student engineer the best of luck in their up-

coming interviews, and in their future engineering careers.

After a short break, the conference next heard from Bud MacNairin, a brokerage businessman from the Edmonton area. The original speaker for the topic "advancement in the Corporate System" was unable to attend, and Mr. MacNairin was a last minute substitute speaker. His talk was the highlight of the day; not specifically for its content, but because of his clean and enthusiastic presentation. Bud told the students that a professional has to look like a professional, and that an advancing engineer must use his technical knowledge plus strong personal motivation to advance in the corporate system. He stressed that technical know-how was not enough; that it had to be coupled with a knack for managing people, then full gains could be experienced by the engineer and his sponsoring company.

Friday, Jan. 4 was designated Canada-International Day at the 12th CCES. One delegate from just about every skule was flown up to the Syncrude Tar Sands Project, north of Fort McMurray. The other local tours included bus trips to a STELCO plant, Edmonton's Water Treatment Plant, and an open-pit coal mine in Wabamum. The participants in the local tours were also treated to lunch at the University of Alberta.

The University is self-contained, similar to Waterloo, and very large. It accommodates about 20,000 full-time students and has a central complex containing shopping malls, student housing and other conveniences. One similarity to the University of Toronto is that parking on campus is a nightmare. Edmonton's new Light Rapid Transit, built coincidentally with the Commonwealth Stadium, is expanding to the

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One of the main attractions of the Congress was the trip to Syncrude.

## 4th Year Thesis Greats

All Engineering students are inevitably faced with the formidable task of preparing a Fourth Year Thesis. In each department, the Centennial Award is presented to the best thesis writer. In the hope of showing what is expected of a 'good' thesis, one of last year's winners has graciously given the CANNON a synopsis of his thesis.

Development of a Computer Assisted Nurse Scheduling System for Lakeshore Psychiatric Hospital.

Jeffrey I. Hall, IND 7T9

Chariot Race

See Tiny Toke Page

This thesis examined the present system for scheduling nursing personnel at Lakeshore Psychiatric Hospital in Toronto and analysed its performance. Alternative systems were considered in an attempt to find a new system which would both relieve the head nurses of the drudgery of preparing monthly schedules by hand and take nursing staff preferences into greater account in the determination of final schedules. The actual system designed is a computer-oriented approach which minimizes nurse aversion to assigned schedules while ensuring that minimum staffing levels are met or exceeded and

all scheduling constraints are satisfied.

The scheduling system in use at the time this thesis was undertaken was a pencil and paper procedure where each head nurse spent an average of eight hours a month to prepare the ward schedule for the next month. Assignment of nurses to particular shifts was generally done by trying to equalize the number of night shifts each nurse had to work. The overriding concern was to produce a schedule that would meet the prescribed staffing levels, hospital policies, and the conditions set out in the collective agreement between the hospital and the nurses. Specific nurse requests were considered whenever convenient, though it was impossible to discern if all nurses were being treated on an equal basis.

A survey of nursing personnel indicated that 66% felt that the present scheduling system could be improved, with an additional 6% labelling its performance as unsatisfactory. In addition, 25% of those surveyed disliked being assigned only day shifts. Thirty-five percent were indifferent to, or actually preferred, working only night or evening shifts. In fact, as the number of shifts a nurse could be assigned to increased

from one to three, the level of satisfaction clearly decreased. It was evident that the existing system could be improved by reducing the number of shift types a nurse could be assigned to and by giving her more control over what those shifts would be.

After examination of the various approaches which could be used to schedule nurses, it was decided that a computer approach would best suit management's needs. An iterative, heuristic approach was used. A master schedule set was created consisting of all schedules that met all of the scheduling constraints. A feasible schedule set was then determined for each nurse consisting of all those schedules in the master set which did not violate her personal constraints.

Each nurse was given an equal number of aversion points to spread among schedule characteristics to quantify her aversion to each one and thus allow us to rank her schedules in order of preference. Each one of a particular nurse's feasible schedules was then given a weighting by applying the corresponding aversion weight for each characteristic contained in that schedule.

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# Too Busy To Be Efficient?

Time plays no favourites. Each day the same amount is available to everyone—a hitchhiker on the highway, your boss... you! In a 365-day year, everyone has 8,760 hours to use, enjoy, waste, invest.

A sizeable portion of that year's time will be spent at "work"—say, a basic 1,880 hours (8 hours per day for 235 working days per year) and, maybe, several hundred more counting a few Saturdays, extra hours, and work taken home.

Good, you work long and hard. But are you satisfied with the way you work? Can you improve your work techniques? Multiply your efforts? Get more out of that non-renewable resource, time? You can, and here's how:

## A Place For Everything

Have a place for everything and keep everything in its place. Beginning now, organize your tools, your desk, your office, your files, or whatever is in a state of disorder. Plan how you will bring order out of that chaos. Then, implement this plan by placing things in their right places, arranged in their right relations to each other, and to your most efficient use.

## Don't Kill Time

We all have time when we are waiting for some reason ("it's only 10 minutes until quitting time"). This type of time should be employed in some useful activity. You can

carry books, or periodicals, or reports to read during these periods. Rescuing these fragments of time can result in an accumulation of many hours of useful knowledge over a period of years.

## Schedule Yourself

Keep a pocket calendar of the type sold in any stationery store. By having a pocket calendar always with you, you can plan, record, and implement action toward a more profitable day. Moreover, you have phone numbers, addresses, and data readily available when you need them.

Allow some free time in your schedule (remember Murphy's Law—"If anything can go wrong, it will go wrong"). Anticipate potential problems and minimize the effects of these by being prepared with contingency actions.

## Quiet Hour

Set aside a quiet hour at some convenient time for concentrated work or for planning future schedules. Have a heart-to-heart talk with yourself during this period. What you think and say to yourself can engender a tremendous constructive power of determined affirmation to bring about the thing you desire.

## Improve Your Study Habits

No matter how old you become, you are not too old to study. The more you know, the

more likely you are to accomplish more and the better you should utilize your time.

- Make up a schedule for your studying.
- Discipline yourself to follow the schedule.
- Set aside a suitable place to study.
- Begin your schedule promptly at the appointed time.
- Concentrate until you have finished at least one major worthwhile task.
- Overlearn—learn thoroughly.
- Limit your program and everyday efforts to what you can accomplish.

Perseverance is a refusal to be discouraged by failure, by doubts, attacks, or the like. It is steadfast, dogged pursuit to the end of the undertaking. Continuous follow-up, pushing, and assurance make a seeming impossibility give way to success.

Perhaps these suggestions sound too simple to be useful. But remember this: You can do three or four times what you are now doing—if you want to improve, and if you want to work at it. The choice is yours. You can invest your time in activity that promises happiness and earning power, or you can throw it away. Whatever, a lack of time is not a problem; it's only an excuse.

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## Editorial Comment

On February 1, 1980 the Engineering Society will be holding another referendum to raise the students' incidental fees. Currently you pay \$12 to the Engineering Society and \$5 to the Engineering Athletic Association. With inflation rising as it has been, and the fact that the fees have stayed the same for quite some time the Society feels justified in asking for this raise. And perhaps rightly so—this year all the Club Grants were reduced from the traditional \$1 a head, to \$0.75 a head for only the clubs' second, third and fourth year members. A half interested student would want to know where the money was otherwise allotted.

Since the Society will be asking you for a raise in your fees you should want to know where and how your money is spent. That way you can make an intelligent decision as to whether the Society is justified in getting a raise. How many of you know how the Engineering Athletic Association spends its \$13,000.00 annual budget?

Hope to see you at the polls February 1.

The CANNON thinks the Eng Soc needs the raise, if only to give back the Club Grants.



Centennial Award Thesis

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The aversion each nurse had bad to all of her previous schedules and the number and type of requests she had been granted were maintained. This information was then used to modify the aversion a nurse had to each of her schedules. For example, a nurse who had very high quality schedules and had been granted many requests would have her schedule aversions modified downwards.

Hospital costs were developed to represent the costs that were incurred as staffing levels deviated from the preferred levels. The total cost of each possible schedule mix (a weighted average of hospital staffing level costs plus nurse aversion to assigned schedules) was calculated and the one with

the lowest cost was chosen. Nurse aversions and the number of requests they had been granted were then used to update the program for the next period and thus ensure that all nurses received equal treatment over a time horizon of two to three months.

The cost of the computer time required to scheduled one 24 nurse ward for one month was only \$20.00. The designed system met with enthusiastic management approval.

This approach is the first of its kind in Canada and can save a hospital many thousands of dollars by substantially reducing annual scheduling costs and nursing turn-over. It is presently being tested at two large Ontario hospitals and will be implemented upon final management approval.

## First Year Introductory Employment Seminars

Introductory employment seminars will be held for FIRST YEAR ENGINEERING students the week of January 21, 1980. They will be of interest to anyone who wants to find out how the UofT Placement Centre can help them in their summer job search. These seminars are particularly aimed at first year engineering students. The schedule is as follows:

Monday, January 21, 12 Noon GB 120

Tuesday, January 22, 1 P.M. GB 120

Wednesday, January 23, 12 Noon GB 120

Thursday, January 24, 1 P.M. GB 120

**Something extra from Labatt's.**



## CCES Conference

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south which will eventually include a stop within the campus.

Without doubt, though, the most impressive sight had to be the Syncrude undertaking.

Syncrude is a company of amalgamated interests of Imperial Oil, Pan-Canadian, Alberta Energy Co. and other Canadian subsidiaries totalling nine firms. Perhaps it should be noted that Imperial holds the controlling share at 25%.

The site was started in spring of 1974 when equipment and materials were moved in. A force of 7500 people was necessary to engineer the project over a span of about 3 years. The site had accommodation for 660 people and the kitchens were capable of producing 27,000 meals per day. The actual cost of the project was about \$2.26 billion.

The process of actually recovering the oil from the tar sands is amazingly simple. It is the massive scale of the operation that is so awesome.

The mining of the sands is accomplished by drag lines. Huge "bucket wheel reclaimers" dig out the oil sand and dump it onto an electric conveyor belt that stretches along 110 metres. There are now four drag lines in all, each with its own belt and reclaimer. The total mining capacity is 6400 tonnes/hour per drag line. Separate conveyor belts carried the raw materials 17.7 km in the mine and 1.6 km in plant.

The extraction process involves feeding the oil sands with a hot water and steam mixture into large rotating tumblers. This slurry is then fed into the primary separation vessels where the aerated bitumen separates into a "whipped froth."

This important froth is centrifuged twice, after having been diluted with naphtha, to remove any remaining water and solids. Once the naphtha is distilled off, the remaining bitumen is a very dense, black, tar-like crude. This must be refined in two subsequent upgrading steps for eventual use as fuels.

The first step involves cracking in fluid cokers to form

coke, gas, naphtha, and gas-oil. Coke is presently being stockpiled for sale to users and sulphur is removed from the gas-oil to render it useful as fuel. The sulphur is recovered and a lot is being bought by an outfit in Red Deer.

The plant will soon be in full production, meaning 283,000 tonnes of oil sand will be mined daily. Daily production of synthetic crude will then be 17,300 m<sup>3</sup> (1982) and 20,500 m<sup>3</sup> in 1984.

Finally it should be mentioned that by law, Syncrude is forced to reclaim all mining and waste dump areas. This work must commence a year after the area has been dormant. Since only clean sand is left as waste in the syncrude process, the reclaimed land will serve more utility than it did before the operation started. Syncrude maintains it is developing fertilizers to mix with the sand and shrubs, etc. that are conducive to the resulting environment. The end result... an improvement over the soft muskeg that exists presently.

Saturday, Jan. 5th, was dedicated to student papers and the plenary session. The morning was devoted to the presentation of 9 student papers; the

afternoon was taken up by the planning of resolutions to act as a guide in the future actions of the CCES.

One of the more interesting student papers presented to the Congress was given by the University of Manitoba delegation. The paper dealt with the problems encountered by the Faculty of Engineering in regards to obtaining suitable funding from the University of Manitoba: the University, according to the Canadian Accreditation Board, has not given the Faculty ample funding, and therefore they will probably lose their accreditation. Without accreditation it becomes virtually impossible for an engineer graduate to become a professional engineer.

This situation exists because the University of Manitoba gives money directly to the faculty teaching any given course. Therefore, when engineering students are taught math, physics or economics courses etc., the funds never reach the Engineering Faculty.

The paper dealt with the ways in which the Faculty and the Student Society tried to deal with this situation. This included meetings with govern-



ment officials, media coverage and an attempt to raise public awareness in regard to the situation. Unfortunately, these efforts met with no success.

As a result of this inaction, when the Engineering Faculty loses its accreditation, the province of Manitoba will not have a single Engineering School. Without accreditation an engineering degree from Manitoba will be on par with a diploma from Ryerson.

Some of the major proposals resolved during the plenary sessions were:

i) that the University of Toronto, Professional Development Committee look into the organization of a delegation to attend the conference on Engineering Education to be held in Toronto, this coming May.

iii) that all women's centres across Canada be abolished.

Next year's conference will be held at Queen's and we're hoping to send more delegates. The topic will be "Engineers in a Government Environment."

## the CANNON

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The CANNON is a publication of the University of Toronto Engineering Society. It is published to announce EngSoc events, discuss Faculty and educational matters, present technical and University news and to be an open forum for the opinions and interests of members of the Faculty. All those who would like to help with the CANNON are most welcome.

Submissions to the CANNON are also welcomed. They should be typed. The deadline for submission of articles for the upcoming Tuesday's CANNON is Thursday at five. EngSoc announcements must be in by noon Monday. The editor reserves the right to edit letters.

The CANNON office is located in the EngSoc offices: Third Floor, Old Metro Library, 20 St. George St., University of Toronto, MSS 2E4.

# Money!

You may recall that a fees referendum was held last fall by the Engineering Society, requesting a fees increase for the Society and the Engineering Athletic Association. The results were overwhelmingly in favour of the increase. However, the procedure used was incorrect, and Council declared the results invalid. This was due to two faults: no written notice of the actual referendum question was given and the referendum was not held on the date specified by council.

As we outlined last fall, the

### The referendum questions will be the following:

Do you support the proposed increase of the Engineering Society Incidental fee from \$12 to \$16, an increase of \$4?

Do you support the proposed increase of the Engineering Athletic Association Incidental fee from \$5 to \$6, and increase of \$1?

# Cannonball 8TO

### THE ANNUAL Engineering Semi-Formal

To Be Held At

### Hart House

In The Great Hall

Saturday, January 19, 1980

An Evening of Music And Dancing,

Featuring

The Nova Sounds

Fine Listening Provided By

E.T.C.

Also Includes

The Famous Infamous Miss Cannonball Contest

The Infamous Famous Inter-Course Competition

The Infamous Unfamous L.G.M.B.

Tickets Go On Sale January 3rd, 1980

\$12.00 per couple  
In The Engineering Stores

# TINY TOIKE PAGE

## CANNONBALL

Because so many people, including fourth year students, have been asking, I thought I'd better explain in some detail what a great event the Cannonball is, and why you should go.

The Cannonball is a semi-formal dance, with a versatile band, NOVA SOUNDS, which plays a large range of music. The dance is held in the Great Hall at Hart House. If you tire of dancing, there is a group of musicians upstairs in the Music Room for easy listening or you can visit the infamous "Inter-Course Competition," which will have displays from the various departmental clubs, tongue-in-cheek; this year's theme is "Alternate Energy Sources." The LGMB will put in their usual disruptive appearance sometime during the night. Bring your friends!

This is a great event in other ways too - the prices for liquor and beer are the same as last year, and very cheap. The tickets are also the same price, only \$12 per couple at the Engineering Stores. This gets you into the dance, and you get the traditional Cannonball Button as well. So bring your date, and anybody else interested in having a good time at one of the better Engineering Society events of the year!

## ELECTRICAL CLUB NEWS

**Ski Trip**  
**January 18-20**  
 Only \$45.00 gives you Bus Fare  
 and 2 nites accomodation.  
 See your Class Rep!

### Annual Electrical Club Hockey Tournament

**January 26, 1980**  
 8:00-11:00 p.m.  
 Varsity Arena  
 Every Class should have a team.  
 See you there.

### Club Chairmen

#### Important Notice!

The deadline for pictures from your clubs is approaching quickly. In order to meet our deadline all photos must be in by January 30, 1980. Otherwise your club won't be in the yearbook!

### No Name Toike Makeup

**January 25, 5:00 p.m. — ?**

Submissions Welcome  
 If it's funny - we'll use it.

### Full Council Meeting

Today at 5:00 p.m.

GB 202

All Reps Must Be There



### Nth Annual Chariot Race

would put even the Romans to shame.

Be a part of it.

**January 25, 1980**  
**Front Campus**  
**High Noon**

(come on all you Clubs, we don't want Mech winning again!!)

# Eng Soc Minutes

Ever wonder what goes on at Eng Soc Meetings? Well with elections (no ours - not Federal) we thought you might like to see what your elected (acclaimed?) officials do. Below is a short summary of the last meetings minutes.

The decision to declare last fall's fees referendum invalid and to hold a new vote highlighted the last Engineering Society Council meeting, held on November 19.

Other items discussed were:

• President's Report: Gary Jones reported that Governing Council requires a professional faculty member to be elected, and suggested that Engineering students should run for this position.

• VP: Administrative: Ken Smith stated that somebody from engineering should attend the SAC lobby group meetings, and asked interested students to contact him.

• VP: Activities: Dave LeGresley reported that McMaster University is encouraging entries for their soap box derby. Damage to the SAC building during orientation cost up to \$7500 (half the original bill), and to Drill Hall during Oktoberfest \$500.

• Treasurer: Siobhan Keogh stated that a revised budget would be presented to Council at the next meeting, and any proposed changes should be forwarded to her by then.

• Pinball Machines: George Klekner-Alt (Blue & Gold Chairman) was appointed by the President to the position of pinball machine supervisor, with a pay of \$50 per month (half paid by pinball company). This position was not advertised for as is required. A motion was made to accept this appointment but it was later withdrawn.

• Communications: Editor Bob Moul said that he wants to cut out 'attacking' material and make the Toike into the good-natured, fun-poking publication that it should be. In response to a question from Council, he said that people have a legal right to petition advertisers. Carling O'Keefe dropped some ads for fall-term Toikes, and he expects them back in the spring.

John Voss was introduced as the new Yearbook Editor. John said that a tentative publishing contract was being drawn up with National School services, and encouraged class reps to stress the buying of the yearbook (probably \$3) in the spring term.

• Women's and Social: Elaine Campbell said the Car Rally went well and was \$30 under budget. Cannonball is on January 19. This year's theme for the Inter-Course Competition is 'Alternative Energy Sources,' and Elaine encouraged entries for that and for Miss Cannonball.

• First Year: Mike Rzadkowski said that the First Annual Godiva pub was successful and made \$350 to \$400 profit.

### More about the Referendum

Last term's referendum on increasing the Engineering Society fees was declared invalid by the Society Council on November 19. A second vote will be held later this term.

Vice President: Administration Ken Smith reported that while the results were strongly in favour of the increase, procedural difficulties might cause Governing Council to reject it. Fees increases must be approved by the University's Governing Council before being put into effect.

A total of 457 students voted, a relatively good turnout (19%). The \$4 increase for general fees was approved by 89%, and the \$1 increase for the Engineering Athletic Association by 78% of the voters.

Smith stated that there was a problem with the date the referendum was held. The Society's Constitution requires two weeks' written notice before a referendum can be held, but he was unable to "get the referendum notice out on time due to personal illness." Rather than violate this requirement, he decided to change the date from that set by Council, acting on his own authority.

Smith asked for a motion supporting the changed date, so that it would be clear it met Council's approval. He also reported that the announcement did not contain an actual draft of the referendum question, as the Constitution specifies. George Klekner-Alt (Blue & Gold Chairman)

pointed out that if the Constitution was violated, the results are void, but Rob Anderson (Speaker) stated that the breaking of the Constitution is a matter of interpretation.

Considerable discussion followed. Class Rep Greg Forbes asked about the possibility of holding a second vote, and whether the results could still be used to obtain an increase for the coming year. Smith initially said that the results would be too late to be effective for next year, but later it was reported that the deadline for applying to Governing Council is February 15.

A vote was held regarding the fall referendum: "That we support the changed date of the referendum and Ken Smith's actions concerning the issue." This motion did not achieve the required 2/3 majority and was defeated.

Council instead decided to hold a new referendum: "That the Engineering Society hold a referendum to increase fees, a four dollar increase for the Society and one dollar for the EAA; this referendum to be held before February 15th, 1980." This motion was clearly carried.

Smith stated that the next referendum should be coordinated with SAC, with SAC scrutineers present. The new vote will have precedence over the previous one, and if it fails the Society will be unable to ask Governing Council for an increase for next year.